CLAIMS

1.A device comprising elements of both a vertical bipolar mode field effect transistor and a vertical bipolar mode static induction transistor on both major surfaces of a lightly doped silicon monocrystal substrate with a long hole lifetime having donor concentration about 10.sup.14 cm.sup.-3:

an epitaxial layer having donor concentration about 10.sup.17 cm.sup.-3, a gate, a normally-off ordinary channel, a thick channel, a source of ordinary channel, a source of thick channel and three electrodes;

said gate, said sources and said channels are disposed in said epitaxial layer;

thickness of said ordinary channel equal to about 1.7.times.thickness of the depletion layer at built in potential;

distance from the boundary of said epitaxial layer to said gate equal to about thickness of the depletion layer at built in potential.

2.The device according to claim 1 wherein said thick channel is connected to said ordinary channel;

thickness of said thick channel equal to about 1.9.times.thickness of the depletion layer at built in potential.

3.The device according to claim 1 wherein a portion of said thick channels of a multielement structure are thicker than the others.

4.The device according to claim 1 wherein said thick channels are normally-on ones.

5.The device according to claim 1 wherein low resistance metal layers with barrier films are disposed over both said gates and said source electrodes.

6.A device comprising elements of both a vertical bipolar mode field effect transistor and a vertical bipolar mode static induction transistor on both major surfaces of a lightly doped silicon monocrystal substrate with a long hole lifetime having donor concentration about 10.sup.14 cm.sup.-3:

a gate, a donor diffusion layer surrounding said gate and thereby forming both a normally-off ordinary channel and a thick channel, a source of ordinary channel, a source of thick channel and three electrodes;

concentration in said donor diffusion layer equal to about 10.sup.17 cm.sup.-3;

thickness of said donor diffusion layer equal to about 10.sup.-5 cm;

thickness of said ordinary channel equal to about 1.4.times.10.sup.-5 cm.

7.The device according to claim 6 wherein said thick channel is connected to said ordinary channel;

thickness of said thick channel equal to about 1.8.times.10.sup.-5 cm.

8.The device according to claim 6 wherein a portion of said thick channels of a multielement structure are thicker than the others.

9.The device according to claim 6 wherein said thick channels are normally-on ones.

10.The device according to claim 6 wherein low resistance metal layers with barrier films are disposed over both said gates and said source electrodes.

11.A device comprising elements of both a vertical bipolar mode field effect transistor and a vertical bipolar mode static induction transistor on both major surfaces of a lightly doped silicon monocrystal substrate with a long hole lifetime having donor concentration about 10.sup.14 cm.sup.-3:

an epitaxial layer having donor concentration about 10.sup.16 cm.sup.-3, a gate, a donor diffusion layer surrounding said gate and thereby forming both a normally-off ordinary channel and a thick channel, a source of ordinary channel, a source of thick channel and three electrodes;

said gate, said donor diffusion layer, said sources and said channels are disposed in said epitaxial layer;

concentration in said donor diffusion layer equal to about 10.sup.17 cm.sup.-3;

thickness of said donor diffusion layer in said channels equal to about 10.sup.-5 cm;

thickness of said ordinary channel equal to about 1.3.times.10.sup.-5 cm;

distance from the boundary of said epitaxial layer to said gate equal to about 5.times.10.sup.-5 cm.

12.The device according to claim 6 wherein said thick channel is connected to said ordinary channel;

thickness of said thick channel equal to about 1.7.times.10.sup.-5 cm.

13.The device according to claim 11 wherein a portion of said thick channels of a multielement structure are thicker than the others.

14.The device according to claim 11 wherein a said thick channels are normally-on ones.

15.The device according to claim 11 wherein low resistance metal layers with barrier films are disposed over both said gates and said source electrodes.

16.A device comprising elements of a vertical bipolar mode field effect transistor on both major surfaces of a lightly doped silicon monocrystal substrate with a long hole lifetime having donor concentration about 10.sup.14 cm.sup.-3:

an epitaxial layer having donor concentration about 10.sup.15 cm.sup.-3, a gate, a donor diffusion layer surrounding said gate and thereby forming both a normally-off ordinary channel and a normally-off thick channel, a source of ordinary channel, a source of thick channel and three electrodes;

said gate, said donor diffusion layer, said sources and said channels are disposed in said epitaxial layer;

concentration in said donor diffusion layer equal to about 10.sup.17 cm.sup.-3;

thickness of said donor diffusion layer in said channels equal to about 5.times.10.sup.-6 cm;

thickness of said ordinary channel equal to about 2.times.10.sup.-5 cm;

distance from the boundary of said epitaxial layer to said gate equal to about 10.sup.-4 cm.

17.The device according to claim 16 further comprising a thicker channel with an source electrode perpendicular to said ordinary channels on both said major surfaces.

18.The device according to claim 16 wherein low resistance metal layers with barrier films are disposed over both said gates and said source electrodes.

19.A device comprising elements of both a n-channel vertical bipolar mode field effect transistor and a p-channel lateral bipolar mode field effect transistor on both major surfaces of a lightly doped silicon monocrystal substrate with a long hole lifetime having donor concentration about 10.sup.14 cm.sup.-3:

an epitaxial layer having donor concentration about 10.sup.15 cm.sup.-3, a p+ gate combined with a drain of a p-channel transistor, a donor diffusion layer surrounding said gate and thereby forming a normally-off ordinary n-channel, a normally-off thick n-channel and a thick n-channel combined with a gate of a p-channel transistor, a source of said ordinary n-channel, a source of said normally-off thick n-channel, a normally-off p-channel, a source of said p-channel transistor are connected with said source of said ordinary n-channel and four electrodes;

said p+ gate, said donor diffusion layer, said sources and said channels are disposed in said epitaxial layer;

concentration in said donor diffusion layer equal to about 10.sup.17 cm.sup.-3;

thickness of said donor diffusion layer in said channels equal to about 5.times.10.sup.-6 cm;

thickness of said ordinary channel equal to about 2.times.10.sup.-5 cm;

distance from the boundary of said epitaxial layer to said gate equal to about 10.sup.-4 cm;

said thick n-channel is perpendicular to said ordinary n-channels.

20.The device according to claim 19 wherein low resistance metal layers with barrier films are disposed over said p+ gates, said sources of p-channel transistors and said source electrodes.

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